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From plankton samples collected, it has been established that Pacific Ocean waters penetrate to the north considerably further than was earlier supposed.

Until recent times, it was thought that the ice cover of the Central Arctic was a continuous mass of strong old ice, but research in the past few years has given new data on the character of this ice cover. Aerial ice surveys, carried out simultaneously with research in the Arctic seas, have given the fullest survey maps of ice composition and dynamics in the Arctic Ocean and adjacent water areas.

It has been established that ice in the ocean is not of a single type, but is actually made up of floes and blocks of various sizes and ages. Separations are found in all mobile ice, regardless of size, location, or degree of hummocking. As a rule, ice grows in size as it moves from south to north, but this rule is often broken. In southern regions of the ocean, larger floes of ice are sometimes found than in the circumpolar areas.

Broad studies have been carried out on the thawing, growth, and breakup of sea ice and the formation of leads and pools. The processes of thawing and growth take place both above and below the ice surface, and in the central part of the ocean and the section lying along the Canadian Arctic Archipelago, the yearly thaw is less than the increase in thickness. In the more southerly regions, lying along the Chukchi and East Siberian seas and in the western (Atlantic) part of the ocean, the yearly growth of the ice is less than the thawing during the drift from north to south. During the summer period there is an intensified thawing on the upper surfaces, but during the winter the growth from the lower surfaces increases. This process is carried on yearly and the ice is thus renewed or "rejuvenated." In many cases, cracks form in the ice cover which do not change their direction when meeting ice floes of different ages and thicknesses, including very large masses of old ice. These cracks are formed as the result of waves emanating from the bottom hydrosphere. The formation of cracks in the ice field depends to a large extent on changes in atmospheric pressure, movements of air and water masses, planetary and seismographic phenomena, local hydraulic fluctuations and other causes.

Research on the formation and route of drifting icebergs has shown considerable variations in their movements from the ordinary routes taken from the areas in which they form -- from Franz Josef Land and Severnaya Zemlya.

Investigations have been carried out on large-icebergs formed from mainland shelf ice, which have received the name of "ice islands." These ice islands were first discovered by Soviet seamen and fliers in 1946. They have various forms with an area reaching 600-700 square kilometers and a height above the sea ice of 10-12 meters. The largest of them, discovered in April 1948 at 82 30 N, 173 00 E, was 28 by 32 kilometers in size.

Research in recent years has established the presence of an anticyclonic drift of ice in the eastern (Pacific) part of the Arctic Ocean (as separated by the Lomonosov range). The drift in this area is along a closed track, the location of which depends on meteorological conditions. This, in part, is verified by studies of the drifting ice islands (as well as the drifting camp of M. Somov) made from 1950 to the present. The drifting station headed by Somov began its drift in March 1950 at 76 10 N, 167 00 W. [Elsewhere in the article it was stated that the station was "set down" at 76 02 N, 166 30 W.]. Over a period of more than a year, the station drifted to a point at 81 45 N, 162 20 W. In March 1952, an ice floe was observed in the area of 82 10 N, 135 00 W; in April 1954, it was observed at 75 04 N, 170 20 W. This ice-drift tract has been noted for 4 years.

The circulation of ice on a closed tract has also been observed in the western part of the ocean, here being in a cyclonic direction. The tract of this drift changes its size and form. Depending on conditions, it may include

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the entire western section of the Arctic Ocean or it may be reduced to the northern part of the Laptev Sea only. From the western regions of the ocean, a considerable part of the ice moves into the Greenland and Barents seas, forming the generally known ice drift from the Arctic Ocean.

The drift tracts are not entirely stable or separate from one another. For example, from the region of closed circulation in the eastern part of the ocean, ice carries to various parts of the Polar basin partly to the Chukchi and East Siberian seas, partly to the Ayon ice mass lying across the Northern Sea Route, partly falling into the western ice drift and thus reaching the Taymyr ice mass, and from there carrying toward the Greenland Sea. It has been shown that the exodus of ice from the Arctic Ocean to the Greenland Sea takes place very irregularly. In April 1954, for example, the loss of ice through this means was insignificant.

The opinion has been held for a long time that the central part of the Arctic Ocean was covered by a cap of high pressure and that anticyclones predominate in the circumpolar area. Soviet scientists have refuted this belief and have shown that varying synoptic conditions exist in the region of the North Pole and surrounding area.

Of great interest has been the data gathered on the penetration of a warm air mass from the Pacific Ocean over the Okhotsk and Bering seas into the high latitudes. In many cases this mass of air extends above the 200-meter-deep ground layer of cold air up to a height of 7-8 kilometers in the troposphere and in area covers the entire polar basin.

Active cyclonic action (and its very considerable seasonal fluctuations), the interaction of the cold Arctic air with the warm air masses coming into the Central Arctic from the Atlantic and Pacific oceans, and the unique process of air mass transformation during the polar day and polar night all combine to force revisions of the old concept of a "polar cap" of cold air.

It was believed formerly that in the Central Arctic the radiation balance for the year was negative. During the drift of the station SP-2 in 1950-1951, the yearly receipt of solar heat on the ice cover was greater than the loss through radiation, diffusion, and reflection; that is, the yearly radiation balance was positive -- 2.9 large calories per square centimeter.

New research has verified the nature of the high-latitude geomagnetic pole. In 1948, research was begun (and continued in recent years) on the magnetic anomaly spreading from a narrow band to a tremendous area across the entire Arctic basin. Narrow connections ran from this magnetic anomaly to the Siberian maximum vertical component of the geomagnetic pole located at the upper Anabar and Kotuy rivers. The relation of this magnetic anomaly with the underwater range imeni Lomonosov has been investigated.

It has been shown that a "second magnetic pole" does not exist. In the area of the supposed "second pole" the horizontal component had a value of 1,500 gamma [one gamma equals .00001 of a gauss] instead of zero, and the dip was not 90 degrees but about 88.5 degrees. -- Burkhanov

POLAR FLIGHTS AND RESEARCH BY SOVIET AIRCRAFT -- Moscow, Smena, No 12, Jun 54

[Note: The item below was extracted from an article by Vodop'yanov which appeared in the Soviet periodical *Smena* in June 1954. Following this is an article on the same subject by the same writer, which appeared in the French Communist periodical *Etudes Sovietiques* in September. Similarity of subject matter and many cases of identical phrasing indicate that the French article is a reprint of the Russian article, yet the information contained in each is different in many respects. It should be noted that the official news of the establishment of the two polar drift stations (Severnny Polyus 3 and 4) was

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released on 17 July 1954 by TASS. Thus, the Russian version of the article appearing below was published before this TASS announcement, while the French version was published after.

No dates are given for the flights discussed in the article, but it is assumed that they occurred after the intensification of research in 1948, except where otherwise stated in the article. They cannot be identified with any pre-war flights as discussed in Soviet historical publications.

A full translation of the same article, as it appeared in *Izvestiya*, 18 July 1954, may be found in Joint Press Reading Service, No 205, Section 13, 24 July 1954. This version is identical with the French.

I have taken part in several expeditions, including one composed of two aircraft piloted by Cherevichnyy and Kotov. I was aboard the plane piloted by Cherevichnyy, deputy chief of the expedition.

We took off from the Moscow airfield and set our course for the north. In a short time Bukhta Tiksi was reached and we set up a land base camp there. We then flew further north to the area of the pole of relative inaccessibility.

When the two planes reached the designated point, they circled until a suitable landing field was found. A camp was set up immediately after landing.

Not far from the living tents, tents for scientific work were set up. Scientific observation went on around the clock.

Another camp was organized 300 kilometers from the geographic pole. Here also interesting scientific work was carried out. The men were able to work in sweaters or shirt sleeves inside the tents raised at the camp, even though the temperature "on the street" was 30-35 degrees below zero.

The planes of the expedition flew from one ice floe to the other constantly organizing new "points." Equipment was unloaded immediately after landing the planes, and observations were taken. When the program was completed, the planes were reloaded and the point abandoned. Those areas which appeared at this time as "white blotches" on the map of the Central Polar basin were explored by us. Material gathered by these expeditions made it possible to plot the bottom of the central part of the Arctic Ocean. Soviet polar researchers discovered and explored the range imeni Lomonosov and conducted broader studies on animal and plant life in the polar area. [Source carried a description of the range.]

I was sitting one day in the hydrobiological tent on the drifting ice while Ya. Ya. Gakkel' raised water samples. With one of the samples he raised a small, blunt-tailed fish about 6 or 7 centimeters long. This was the largest fish caught at the 87th parallel of latitude.

Even in 1937, when the plane N-170 flew to the pole, small birds were seen a thousand and more kilometers from shore.

After several years, we again made the "jump" to the pole. The plane piloted by Cherevichnyy was the first to land on the ice. The floe chosen by him for landing was about 700 meters long, almost perfectly oval in shape, and made up of old, hummocked ice. Landing at the pole, we gave three cheers for the Communist Party and Soviet Government and raised the Soviet flag on the highest hummock. I was not flying to the pole for the first time -- nor were Pilot Mazuruk, Navigator Akkuratov, Movie Operator Troyanovskiy, and Mechanic Shmandin.

The plane piloted by Cherevichnyy, with the director of the expedition aboard, soon returned to base, leaving the planes commanded by Kotov and Maslennikov on the ice.

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Tent laboratories were set up at the pole and scientific observations began 2 1/2 hours after landing on the ice

Hydrologist P. A. Gordiyenko, coming out of a tent, suddenly found a fissure system drawn across the white ice. This seemingly innocent fissure was to become a near catastrophe. The entire camp was immediately alerted and the mechanics rushed to the planes to start the engines -- a difficult feat because of the freezing temperatures.

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The fissure which began in the thin ice of the aerodrome continued across the old pack ice on which the airplanes were based. Using plywood, boards, and ice blocks, a bridge across the fissure, which had spread to 1 1/2 meters by this time, was effected and the planes were run across to a new ice floe. The equipment and tents were also moved.

Eventually, with the arrival of high winds, it was decided to move to another area. The fissures were filled with snow and ice and the air strip thus formed was used to get the planes off the ice to move to a new location. [No discussion of Severnyy Polyus 3 or 4 was carried in source.]

Paris, Etudes Sovietiques, Sep 54

In 1941, the famous polar aviator I. Cherevichnyy completed an audacious exploit. With his aircraft outfitted with the instruments required for making observations, he landed three times on ice floes where he remained several days each time to make scientific observations. In 65 days his plane covered 26,000 kilometers.

After the war, heavy planes once again took off to fly over the north with explorers and scientists.

From Kotel'nyy Island, where a provisional base had been organized, two planes set out for the pole of relative inaccessibility under the command of the experienced polar fliers Kotov and Cherevichnyy. I was aboard Cherevichnyy's plane as deputy chief.

On 9 April [year not given], a suitable ice floe for a landing was chosen at 80 30 N, 150 00 E. Work was begun immediately on the construction of a "city" and living and laboratory tents were raised. Observations were made throughout the 24-hour period. The tents were warm inside -- the men could work in shirt sleeves even though the temperature "in the street" was 35 degrees below zero.

At the same time, similar camps were organized on two other ice floes -- at 86 30 N, 157 00 E, and at 80 15 N, 177 00 E. From these camps aircraft left each day to organize new stations to allow short-term scientific work to be carried out. For one day or two, sometimes three, observations were recorded, then the equipment was reloaded into the airplane and the group left for another floe. Each of these stations meant the end of a "white blotch" on the map of the Central Polar Basin.

In the spring, Soviet scientists once again carried out research directly at the North Pole. Three planes made the landing there.

I have made three trips to the North Pole, and many of the expedition, such as Mazuruk, Akkuratov, and Shmandin and Troyanovskiy, have made two trips there.

On the first trip I made to the pole, a great fissure split the camp area and it was with considerable difficulty that we were able to get off with the planes. The second expedition was made a year later with planes again of Polar Aviation and scientific observations were made.

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Depth soundings made during these expeditions resulted in the discovery of the range Ireni Lomonosov. [Source carried a description of the range.] The postwar expeditions have resulted in a massive amount of information on the character of the water masses of the ocean, on the composition of the air masses over the central Arctic, and the important laws governing the movement of cyclonic and anticyclonic air masses across the Arctic.

The group of scientists under the direction of M. Somov, who drifted for about 30 months in an inaccessible area of the Arctic, made an important contribution to the research on the Central Polar basin.

I commanded a plane which carried 20 tons of cargo (including an automobile and great quantities of fresh food) to the station commanded by Somov.

But the Arctic has not given all its secrets, and in the spring of this year a new expedition departed. [Description of Severnyy Polyus 3 and 4 followed in source.]

EQUIPMENT AND ACTIVITIES OF DRIFT STATIONS -- Moscow, Literaturnaya Gazeta, 20 Jul 54

Although no fissures have threatened the camp at Severnyy Polyus 4, Tolstikov has ordered all emergency supplies moved to a safe place so as to be prepared for all contingencies. Containers of food and fuel drums are located on iron plates which are curved in a sleigh-like manner and covered by a KPSH-1 tent. The entire unit can be towed by a tractor to areas selected from the helicopter piloted by Mel'nikov.

Moscow, Sovetskaya Kul'tura, 31 Jul 54

Aerologists S. I. Tsigel'nitskiy and P. P. Poslavskiy are working at Severnyy Polyus 3.

Moscow, Krasnaya Zvezda, 8 Aug 54

During the last days of July, there was so much water on the ice at Severnyy Polyus 3 that the radio station actually became an island. A river 2 meters wide ran in front of the station and a lake formed behind it.

Moscow, Radio, No 9, Sep 54

The batteries for the radio station at Severnyy Polyus 4 are charged by internal-combustion engines and wind motors.

K. Kurko, who served on Severnyy Polyus 2, is chief radio operator at Severnyy Polyus 3. L.N. Kazbash is the second radio operator.

The radio operators at Severnyy Polyus 3 have followed the experience of amateur radio operators in choosing wave lengths which will assure unbroken communications with Moscow. Even radiotelephone communications have been good so far between the drift station and the Soviet capital.

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Moscow, Stroitel'naya Gazeta, 10 Oct 54

When the two drift stations were first set up, the personnel lived in tents, but in a short time airplanes delivered collapsible houses produced by the Leningrad Timber Plant Sovetskiy of the Ministry of Timber Industry USSR. The houses were designed by S. Shaposhnikov of Glavsevmorput' (Main Administration of the Northern Sea Route) so as to be easily portable and quickly assembled. Ten of these collapsible houses were delivered

The main failing of these houses is the gas heating and lack of ventilation. In the near future, however, the personnel of the stations will receive five houses of better construction. These houses have been built by the Administration of Finishing Work of Glavmosstroy (Main Administration of Housing and Civil Construction, Executive Committee of the Moscow City Soviet) according to the design of Polar Aviator I. Mazuruk and Engineer Ye. Pappe of the Central Design-Construction Bureau No 2 of the Ministry of Maritime Fleet USSR. The new houses differ from the old in that they are made of sturdier material and allow even less heat loss. The frame of the panels is of light wood with chopped cork stuffed between the inside and outside layers.

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The thickness of the side walls is 80 millimeters, the roof 60 millimeters, and the floor 100 millimeters. The house is assembled from 19 parts. To prevent freezing in the walls, the designers employed an original method of joining the various parts -- no through metal connecting parts are used in the walls or windows. The panels are connected to each other by special wedge-shaped cleats on the outer side which are tightened by turnbuckles. Between the sheets, at the connecting points, a rubber strip is inserted, which provides an airtight seal when the connections are tightened. According to the designers, the house will not sink if dropped in water.

The houses are heated by a central hot-water system. The water is heated in an ordinary boiler, piped to the radiators, and then returned to the boiler. It can be fired by either coal or wood. According to estimates, the temperature inside the houses should be maintained at not less than 16 degrees with an outside temperature of minus 40 degrees.

Each house contains a foyer for undressing, a toilet, and a room for four men with an area of 10.2 square meters. Each house rests on a foundation of two skis. To prevent this light house (weighing about one half ton with all equipment) from blowing away in the wind, it is braced with guy wires.

Moscow, Pravda, 21 Oct 54

The workers of Severnyy Polyus 4 are in their 7th month on the drifting ice.

On 17 September, the camp found that the ice floe on which the drifting station was located had drifted in a circular course (clockwise) returning to the point at which they were located on 25 August. During the time of this circular drift (more than 100 miles in length), the floe approached the 80th parallel, then headed south again to the 79th parallel. After 19 September, the drift abruptly changed direction and began moving slowly northward again. At the end of September, the drift had increased considerably in speed, reaching a speed of 6-7 miles per day.

The camp is taking on a winter appearance. Large snowdrifts are being piled up on the ice by the southeasterly winds. The snow cover in some places exceeds 50 centimeters in depth.

With the arrival of winter, the scientific workers of the station are making numerous new observations. Studies of the upper layers of the stratosphere are continuing through the use of radiosondes and meteorographs sent aloft in helicopters. During the time of the drift, the station has made 400 radiosonde observations.

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Regular air communications with the mainland continue as in the summer.

BUKHTA TIKHAYA POLAR STATION -- Moscow, Ogonek, 26 Sep 54

Not long ago, a plane from Glavsevmorput' arrived in the polar station at Bukhta Tikhaya with the usual fruits, vegetables, and newspapers, but in addition brought congratulatory messages in connection with the 25th anniversary of the establishment of the station.

In 1929, the icebreaker SS Georgiy Sedov delivered an expedition to Franz Josef Land with the task of establishing a permanent polar station on one of the islands there. The expedition was headed by O. Yu. Shmidt; his deputy for scientific work was V. Yu. Vize; and the commander of the Sedov was Captain V. I. Voronin.

The location chosen for the station was Bukhta Tikhaya.

A large building was immediately raised on the island along with a warehouse and bath. In addition to living quarters, the building contained a radio station, a meteorological station, and a company room. The first radio message was soon sent to Moscow from this most northerly station in the world.

With each year since then, the work and the settlement of the station have been increased.

The workers at the station took an active part in the establishment of the first drift station, Severnyy Polyus 1, and in transarctic flights by Soviet pilots. Work at the station was not interrupted for a single day during World War II.

Now the personnel of the station live in well-constructed houses. An independent power plant assures current for the equipment and homes. A large library is available and Moscow newspapers and periodicals are regularly received. Motion pictures and other entertainment are available.

ARCTIC TRUST LIQUIDATED -- Moscow, Verchernyaya Moskva, 9 Aug 54

The trust Arktikrazvedka (Arctic Exploration) of Glavsevmorput' has been liquidated. Claimants should apply to the liquidation commission, Moscow, Ulitsa Razina 9, before 20 August 1954. No claims will be accepted after this date.

-- Advertisement

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